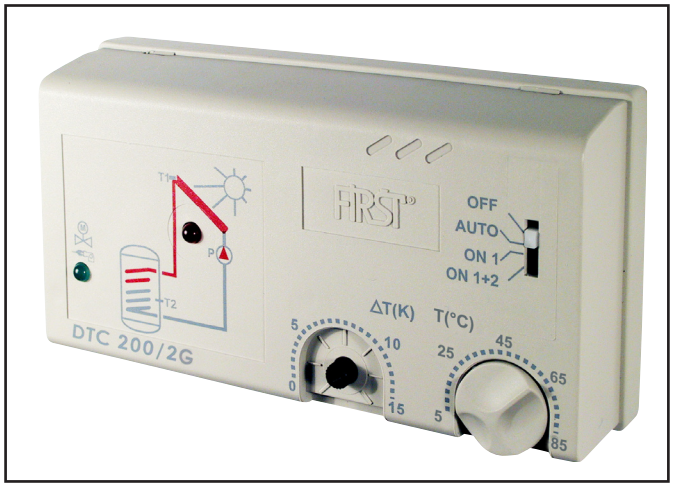
USER'S MANUAL

DTC 200/2G

Differential thermostat can be used for:
- Heating sanitary water with possibility to control the burner.
- Cooling living space with blowing the cool outside air into the living space



DEAR CUSTOMER
You have bought a DTC 200/2G differential thermostat, manufactured according to the latest quality and safety standards. It is designed in compliance with strict criteria and requirements of West European markets and enables efficient use of solar energy which enables considerable savings of other sources for domestic water heating. It was tested at TUV institute in München.
Our products are available in the markets for several years and satisfy the needs of demanding customers from hot Greece to north Germany.
We are convinced that the use of our product will satisfy your needs too and help you to save your money.

Thanks for your confidence !

FIRŠT

USER'S MANUAL

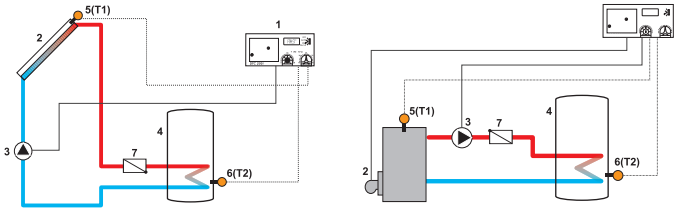
This manual is for user. It describes the operation of differential thermostat and it's correct use. Before setting the parameters be sure in which way of use is used. Carefully read the instructions to make good use of the product.

We reserve the right to modify the instructions and the technical data of the product without prior notice.

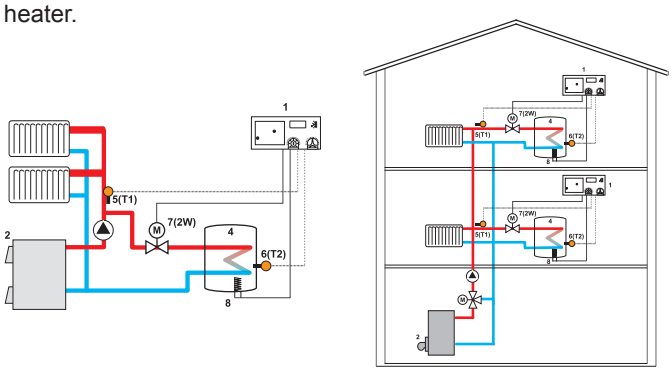
GENERALLY:

With differential thermostat there are three possible ways of use:

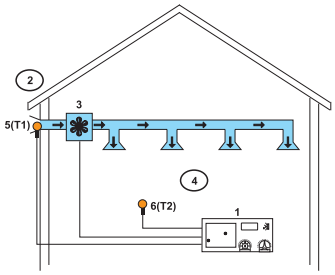
1. HEATING THE DOMESTIC HOT WATER FROM ONE HEATING SOURCE (SOLAR COLLECTORS, BOILERS, HEAT PUMP...) WITH CONTROLLING THE HEATING SOURCE (BURNER).
Differential thermostat controls the electric motor actuated ball valve (EMV 110..) and the circulation pump. If it necessary, turns ON or OFF the heating source (burner).



2. HEATING THE DOMESTIC HOT WATER FROM ONE HEATING SOURCE (SOLAR COLLECTORS, BOILERS, HEAT PUMP...) WITH ADDITIONAL HEATING WITH ELECTRICAL HEATER.
Differential thermostat controls the electric motor actuated ball valve (EMV 110..) and the circulation pump. In case that the primary heating source (solar collectors, boilers...) has not enough energy, water in water tank is heated with electrical heater.



3. COOLING LIVING SPACE WITH BLOWING THE COOL OUTSIDE AIR INTO THE LIVING SPACE
Differential thermostat controls the ventilator.



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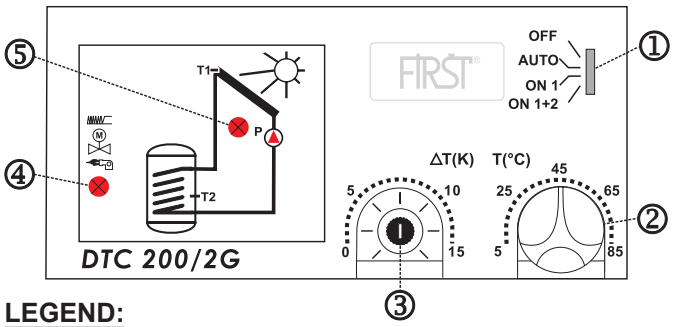
1st WAY OF USE

HEATING THE DOMESTIC HOT WATER FROM ONE HEATING SOURCE (SOLAR COLLECTORS, BOILERS, HEAT PUMP...) WITH CONTROLLING THE HEATING SOURCE (BURNER).

OPERATION

DTC 200/2G single differential thermostat measures the temperature of heating source (collectors, boiler, ...) and in user (hot water tank).
Heating effect is provided, when heating source temperature is higher than the temperature of the user (water in hot water tank). Consequently minimum difference should be 3K-5K. Recommendable minimal value is 5K.
When the temperature of the source exceeds the temperature around the user for pre-set difference opens the electric motor actuated ball valve and switches the pump.
The thermostat switches off the pump if pre-set temperature is reached in hot water tank (adjustable from 5° to 85°C).
If it's need for heating the hot water tank and the temperature of heating source (boiler) is to low, then thermostat switch on the burner of the boiler and when the conditions of the difference is assured, pump is switch on.
The burner is always on, when the heating is needed.

CONTROL PANEL:

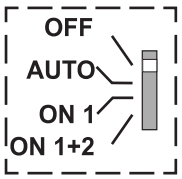


LEGEND:

1. Selector switch for choosing the operation
2. Knob for setting temperature in DHWT (domestic hot water tank)
3. Knob for setting temperature difference of heating source (collectors, boiler, ...) and in user (hot water tank).
4. LED indicator for burner operation.
5. LED indicator for pump operation.

Use of selector switch:

With selector switch (1) you select one of the following modes of operation:



OFF Irrespective of temperature values the pump is off.

AUTO Automatic operation of thermostat (normal operation)

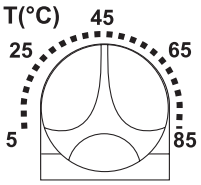
ON 1 Irrespective of temperature values the pump is on. This mode is designed for testing purposes, servicing and in case of troubles.

ON 1+2 Irrespective of temperature values the pump and burner are on. This mode is designed for testing purposes, servicing and in case of troubles.

⚠ **Mode OFF doesn't enable galvanic separation from mains. When replacing the pump, disconnect supply voltage!**

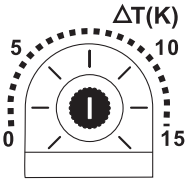
TEMPERATURE SETTING OF HOT WATER TANK

With knob (2) you can set max. temperature in water tank between 5°C and 85°C.
When the temperature is reached, thermostat deactivates pump and close motorised ball valve regardless the temperature of heating source.
If hot water is used by the appliance with limited max. temperature of inflow, this setting is very useful.



DIFFERENCE SETTING

With knob (3) you can set temperature difference of heating source (collectors, boiler, ...) and in user (hot water tank) between 0K and 15K.
Heating effect is provided, when heating source temperature is higher than the temperature of the user (water in hot water tank). Consequently minimum difference should be 3K-5K.
The difference is set in relation to the volume of heat losses of the system which depend on lengths of pipes from source to the water tank and on pipeline insulation.



2nd WAY OF USE

HEATING THE DOMESTIC HOT WATER FROM ONE HEATING SOURCE (SOLAR COLLECTORS, BOILERS, HEAT PUMP...) WITH ADDITIONAL HEATING WITH ELECTRICAL HEATER.
Differential thermostat controls the electric motor actuated ball valve (EMV 110..) and the circulation pump. In case that the primary heating source (solar collectors, boilers...) has not enough energy, water in water tank is heated with electrical heater.

OPERATION:

DTC 200/2G single differential thermostat measures the temperature of heating source (collectors, boiler, ...) and in user (hot water tank).

Heating effect is provided, when heating source temperature is higher than the temperature of the user (water in hot water tank). Consequently minimum difference should be 3K-5K. Recommendable minimal value is 5K.

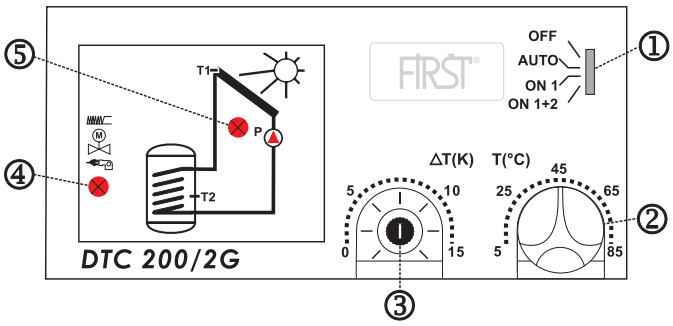
When the temperature of the source exceeds the temperature around the user for pre-set difference opens the electric motor actuated ball valve and switches the pump.

The thermostat switches off the pump if pre-set temperature is reached in hot water tank (adjustable from 5° to 85°C).

If it's need for heating the hot water tank and the temperature of heating source (boiler, collector) is to low, then thermostat switch on electrical heater. Electrical heater heats water to desire temperature.

Electrical heater is active, when the primary heating source is inactive - they never work at same time. Priority has main heating source (collector, boiler, ...).

CONTROL PANEL:



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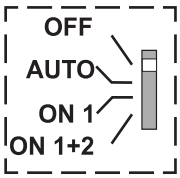
LEGEND:

1. Selector switch for choosing the operation
2. Knob for setting temperature in DHWT (domestic hot water tank)
3. Knob for setting temperature difference of heating source (collectors, boiler, ...) and in user (hot water tank).
4. LED indicator for need for heating water in DHW tank. It doesn't show working of el. heater.
5. LED indicator for pump operation.

Use of selector switch:

With selector switch (1) you select one of the following modes of operation:



OFF Irrespective of temperature values the pump and burner are off.

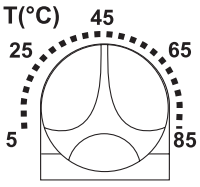
AUTO Automatic operation of thermostat (normal operation)

ON 1 Irrespective of temperature values the pump is on. This mode is designed for testing purposes, servicing and in case of troubles.

ON 1+2 Irrespective of temperature values the pump and el. heater are on. This mode is designed for testing purposes, servicing and in case of troubles.

⚠ **Mode OFF doesn't enable galvanic separation from mains. When replacing the pump, disconnect supply voltage!**

TEMPERATURE SETTING OF HOT WATER TANK



With knob (2) you can set max. temperature in water tank between 5°C and 85°C.
When the temperature is reached, thermostat deactivates pump and closes motorised ball valve regardless the temperature of heating source.
If hot water is used by the appliance with limited max. temperature of inflow, this setting is very useful.

DIFFERENCE SETTING

With knob (3) you can set temperature difference of heating source (collectors, boiler, ...) and in user (hot water tank) between 0K and 15K.
Heating effect is provided, when heating source temperature is higher than the temperature of the user (water in hot water tank). Consequently minimum difference should be 3K-5K.
The difference is set in relation to the volume of heat losses of the system which depend on lengths of pipes from source to the

3rd WAY OF USING

Cooling living space with blowing the cool outside air into the living space

OPERATION

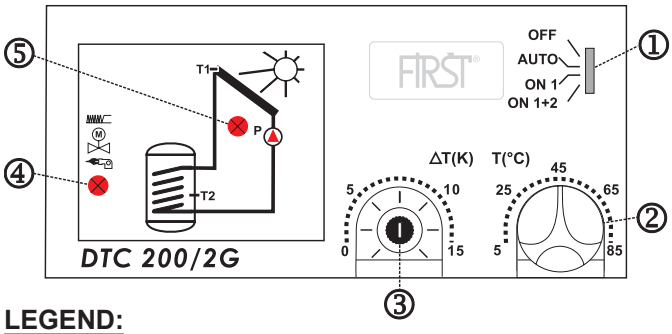
DTC 200/2G single differential thermostat measures the temperature of outside air and inside air.

Cooling effect is provided, when cooling source temperature is lower than the temperature of inside air. Consequently minimum difference should be 2K.

When the temperature of outside air is below the temperature of inside air it switches on the ventilator.

The thermostat switches off the ventilator if pre-set minimum temperature is reached (adjustable from 5° to 85°C).

CONTROL PANEL:

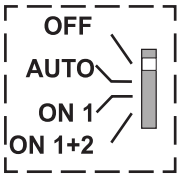


LEGEND:

1. Selector switch for choosing the operation
2. Knob for setting minimal ambient temperature
3. Knob for setting temperature difference of cooling source (outside air) and ambient.
4. LED indicator - not in function
5. LED indicator for ventilator operation.

Use of selector switch:

With selector switch (1) you select one of the following modes of operation:



OFF Irrespective of temperature values the ventilator is off.

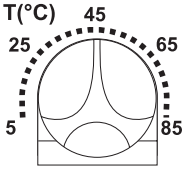
AUTO Automatic operation of thermostat (normal operation)

ON 1 Irrespective of temperature values the ventilator is on. This mode is designed for testing purposes, servicing and in case of troubles.

ON 1+2 Irrespective of temperature values the ventilator is on. This mode is designed for testing purposes, servicing and in case of troubles.

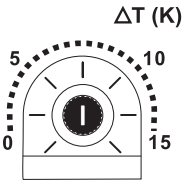
⚠ **Mode OFF doesn't enable galvanic separation from mains. When replacing the pump, disconnect supply voltage!**

MINIMAL TEMPERATURE SETTING OF AMBIENT



With knob (2) you can set min. temperature in ambient 5°C and 85°C.
When the ambient temperature is reached, thermostat deactivates ventilator regardless the temperature of cooling source (outside air).

DIFFERENCE SETTING



With knob (3) you can set temperature difference of cooling source (outside air) and in ambient between 0K and 15K.
Cooling effect is provided, when cooling source temperature is lower than the temperature of inside air. Consequently minimum difference should be 2K.

Trouble shooting guide

TROUBLE	POSSIBLE FAILURE	REMEDY
The pump is not operating irrespective of temperature	- Power supply is not connected - Selector switch is in position OFF - DHWT sensor T2 is disconnected - Collector sensor T1 is short circuited	- Check power supply - Set the selector switch in position AUTO - Check sensor - Check sensor
The pump operating permanently irrespective of temperature	- Selector switch is in position ON1 - Collector sensor T1 is disconnected - DHWT sensor T2 is short circuited	- Set the selector switch in position AUTO - Check sensor -Check sensor
The pump and burner operating permanently irrespective of temperature	- Selector switch is in position ON1+2 - Collector sensor T1 is disconnected - DHWT sensor T2 is short circuited	- Set the selector switch in position AUTO - Check sensor - Check sensor
Temperature regulation of DHW tank is not working	- Motorised ball valve is permanently open or nonreturn valve is open (thermosiohon water circulation is enabled)	Check the installation
In spite of enough collector's energy the water temperature in DHWT is not high enough – water is too cold	-Setting of DHWT temperature is too low -The difference setting is set to high	-Check settings
The temperature is reached, but the heating/cooling is still running	- Jumpers are not set correctly	- Check jumper's settings
In AUTO position nothing happens	- Jumpers are pulled out	- Set jumpers in suitable position

Advantages of motor actuated ball valves of EMV110..series with incorporated relay module for solar heating systems

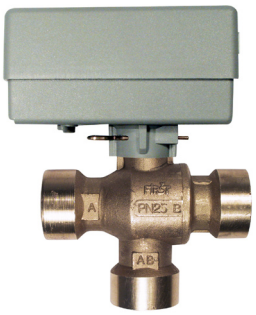
In solar heating systems motor actuated ball valves can prevent various inconveniences.

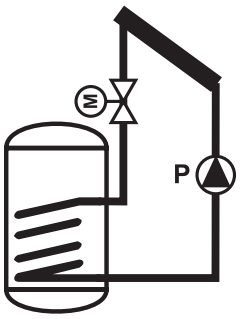
- Effectively prevent hydraulic shocks in systems as they require 30 seconds for complete opening.
- Due to their shape they do not impede the flow.
- Springs are not included, therefore noise does not appear.
- When closed, 100% sealing is guaranteed.
- They have an output for pump up to 100 W in open position, therefore they do not present a hydraulic load for pump in closed position. They enable pump switching on only in completely open position.
- Due to installed RELAY module they enable control with make contact only.
- If during closing or opening process impurities enter in valve, which could block it, the valve stops and immediately afterwards continues with opening or closing process in opposite direction, so that water flow can rinse the impurities up to cleaning net (anti-blocking system).
- Possibility of manual control. This function relieves airing the system or filling the system with water.
- It prevents coaxial cooling of DHWT by one pipe in night-time.

EMV 110 602/4230

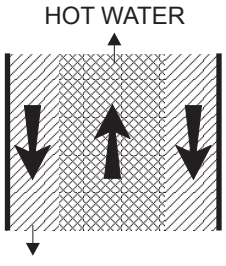
EMV 110 502/7930

EMV 110 316/89I0





For preventing coaxial cooling in night-time it is necessary to build in motorised ball valve EMV 110... in heating pipe of DHW tank exchanger.



In night-time the temperature of water in DHWT is usually higher than in collector. In this case it is possible coaxial cooling of the DHWT through one pipe. If the pipe has enough diameters and it is straight and vertical, then water circulation begins in just one pipe. In the middle, water goes upwards, and at the edges downwards.

One solution for this is to build in nonreturn valve. But with its use is increased the load of pump, the flow reduced, and the ventilation of the system hindered.

All these problems are solved by the motorised ball valve series EMV 110 ...

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